

Variant FCC RF Test Report

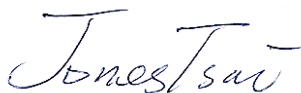
APPLICANT : Foxconn International Holdings Ltd.
EQUIPMENT : Data Card
BRAND NAME : AMBIT
MODEL NAME : NF2
MARKETING NAME : M.2 MODULE
FCC ID : RYQ-NF2
STANDARD : FCC 47 CFR Part 2, 22(H), 24(E), 27(L)
CLASSIFICATION : PCS Licensed Transmitter (PCB)

This is a variant report which is only valid together with the original test report. The product was received on Aug. 07, 2013 and testing was completed on Oct. 31, 2013. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI / TIA / EIA-603-C-2004 and shown to be compliant with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.



Reviewed by: Joseph Lin / Supervisor



Approved by: Jones Tsai / Manager



SPORTON INTERNATIONAL INC.

No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.

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FCC ID : RYQ-NF2

Page Number : 1 of 19

Report Issued Date : Nov. 01, 2013

Report Version : Rev. 01

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SPORTON INTERNATIONAL INC.

SUMMARY OF TEST RESULT

Report Section	FCC Rule	IC Rule	Description	Limit	Result	Remark
3.1	§2.1046	RSS-132 (5.4) RSS-133 (6.4) RSS-139 (6.4)	Conducted Output Power	N/A	PASS	-
3.2	§2.1053 §22.917(a) §24.238(a) §27.53(g)	RSS-132 (5.5) RSS-133 (6.5) RSS-139 (6.5)	Field Strength of Spurious Radiation	$< 43 + 10 \log_{10}(P[\text{Watts}])$	PASS	Under limit 23.10 dB at 3760.000 MHz

1 General Description

1.1 Applicant

Foxconn International Holdings Ltd.

No. 4, Mingsheng St., Tu-Cheng Dist., New Taipei City 23679, Taiwan

1.2 Manufacturer

Foxconn International Holdings Ltd.

No. 4, Mingsheng St., Tu-Cheng Dist., New Taipei City 23679, Taiwan

1.3 Feature of Equipment Under Test

Product Feature	
Equipment	Data Card
Brand Name	AMBIT
Model Name	NF2
Marketing Name	M.2 module
FCC ID	RYQ-NF2
EUT supports Radios application	GSM/EGPRS/WCDMA/HSPA/LTE
HW Version	PR4.5
SW Version	FIH7160_MODEM_01.1338.03
EUT Stage	Production Unit

Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

1.4 Product Specification of Equipment Under Test

Product Specification subjective to this standard	
Tx Frequency	GSM850: 824.2 MHz ~ 848.8 MHz GSM1900: 1850.2 MHz ~ 1909.8MHz WCDMA Band V: 826.4 MHz ~ 846.6 MHz WCDMA Band IV : 1712.4 MHz ~ 1752.6 MHz WCDMA Band II: 1852.4 MHz ~ 1907.6 MHz
Rx Frequency	GSM850: 869.2 MHz ~ 893.8 MHz GSM1900: 1930.2 MHz ~ 1989.8 MHz WCDMA Band V: 871.4 MHz ~ 891.6 MHz WCDMA Band IV : 2112.4 MHz ~ 2152.6 MHz WCDMA Band II: 1932.4 MHz ~ 1987.6 MHz
Maximum Output Power to Antenna	GSM850 : 32.79 dBm GSM1900 : 29.66 dBm WCDMA Band V : 23.49 dBm WCDMA Band IV : 23.58 dBm WCDMA Band II : 24.03 dBm
Type of Modulation	GSM: GMSK GPRS: GMSK EDGE: GMSK / 8PSK WCDMA: QPSK (Uplink) HSDPA: QPSK (Uplink) HSUPA: QPSK (Uplink)

1.5 Modification of EUT

No modifications are made to the EUT during all test items.

1.6 Testing Site

Test Site	SPORTON INTERNATIONAL INC.		
Test Site Location	No. 52, Hwa Ya 1 st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL: +886-3-327-3456 FAX: +886-3-328-4978		
Test Site No.	Sporton Site No.		FCC/IC Registration No.
	TH02-HY	03CH07-HY	722060/4086B-1

1.7 Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ FCC 47 CFR Part 2, 22(H), 24(E), 27(L)
- ♦ ANSI / TIA / EIA-603-C-2004
- ♦ FCC KDB 971168 D01 Power Meas. License Digital Systems v02r01

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

2 Test Configuration of Equipment Under Test

2.1 Test Mode

During all testing, EUT is in link mode with base station emulator at maximum power level. The spurious emission measurements were carried out in semi-anechoic chamber with 3-meter test range.

Frequency range investigated for radiated emission is as follows:

1. 30 MHz to 9000 MHz for GSM850
2. 30 MHz to 19000 MHz for GSM1900

Test Modes	
Band	Radiated TCs
GSM 850	■ GPRS class 8 Link
GSM 1900	■ GPRS class 8 Link

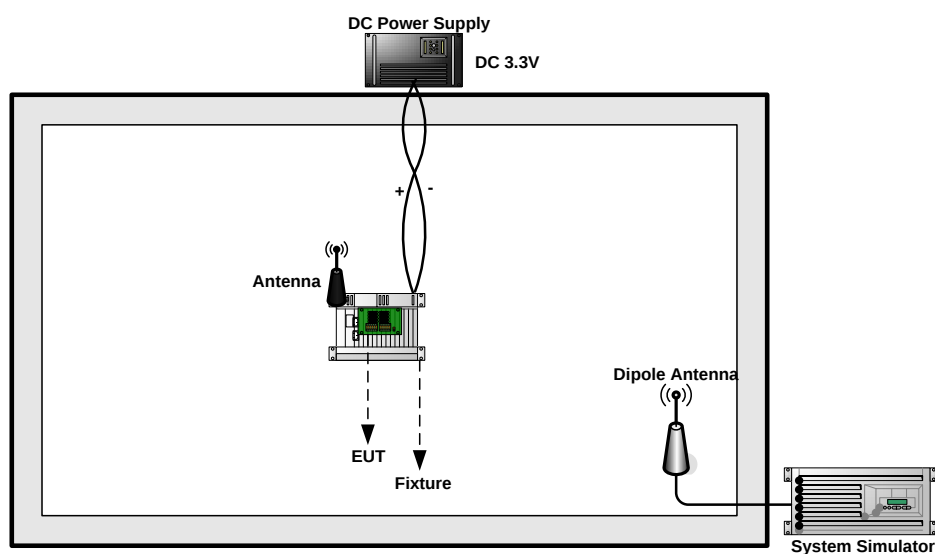
Note: The maximum power levels are GPRS multi-slot class 8 modes for GMSK link, only these modes were used for all tests.

The conducted power tables are as follows:

Conducted Power (*Unit: dBm)						
Band	GSM850			GSM1900		
Channel	128	189	251	512	661	810
Frequency	824.2	836.4	848.8	1850.2	1880	1909.8
GPRS class 8	32.67	32.63	32.79	29.56	29.66	29.46
GPRS class 10	32.41	32.51	32.57	29.43	29.62	29.41
GPRS class 11	31.92	32.14	32.18	28.74	28.68	28.71
GPRS class 12	30.51	30.77	30.96	27.45	27.51	27.42
EGPRS class 8	26.90	26.66	26.74	25.68	25.90	26.03
EGPRS class 10	26.84	26.59	26.73	25.71	25.72	26.01
EGPRS class 11	25.77	25.68	25.89	24.98	25.16	25.27
EGPRS class 12	24.57	24.38	24.48	23.70	23.95	24.00

Conducted Power (*Unit: dBm)									
Band	WCDMA Band V			WCDMA Band II			WCDMA Band IV		
Tx Channel	4132	4182	4233	9262	9400	9538	1312	1413	1513
Rx Channel	4357	4407	4458	9662	9800	9938	1537	1638	1738
Frequency	826.4	836.4	846.6	1852.4	1880	1907.6	1712.4	1732.6	1752.6
RMC 12.2K	23.34	23.24	23.49	24.03	23.92	23.87	23.34	23.58	23.41
HSDPA Subtest-1	23.37	23.26	23.48	24.01	23.81	23.81	23.29	23.55	23.30
HSDPA Subtest-2	23.28	23.29	23.44	23.99	23.87	23.90	23.33	23.00	22.86
HSDPA Subtest-3	22.28	22.24	22.36	23.09	22.76	22.94	22.46	22.55	22.85
HSDPA Subtest-4	22.30	22.25	22.28	23.04	22.88	22.88	22.60	22.40	22.64
HSUPA Subtest-1	22.28	22.20	22.11	22.96	22.70	22.82	22.83	22.97	22.82
HSUPA Subtest-2	20.21	20.10	20.03	21.69	21.44	21.38	20.84	20.87	20.67
HSUPA Subtest-3	21.14	21.08	21.03	22.14	21.88	22.09	21.77	21.93	21.64
HSUPA Subtest-4	20.24	20.09	20.05	21.59	21.36	21.26	21.14	20.98	20.93
HSUPA Subtest-5	22.85	22.78	22.69	23.51	23.02	23.18	23.24	23.48	23.31

2.2 Connection Diagram of Test System



2.3 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model No.	FCC ID	Data Cable	Power Cord
1.	Power Supply	GWINSTEK	PSS-2002	N/A	N/A	Unshielded, 1.8 m
2.	System Simulator	R&S	CMU200	N/A	N/A	Unshielded, 1.8 m
3.	Fixture	INTEL	NGFF Card Carrier	N/A	N/A	N/A

3 Test Result

3.1 Conducted Output Power Measurement

3.1.1 Description of the Conducted Output Power

A base station simulator was used to establish communication with the EUT. Its parameters were set to transmit the maximum power on the EUT. The measured power in the radio frequency on the transmitter output terminals shall be reported.

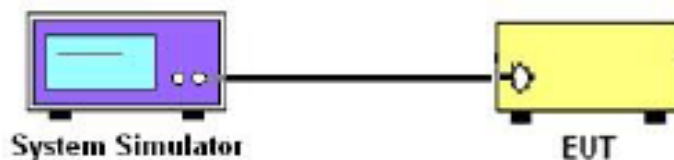
3.1.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.1.3 Test Procedures

1. The transmitter output port was connected to base station.
2. Set EUT at maximum power through base station.
3. Select lowest, middle, and highest channels for each band and different modulation.
4. Measure the maximum burst average power for GSM and maximum average power for GSM and WCDMA modes.

3.1.4 Test Setup



3.1.5 Test Result of Conducted Output Power

Cellular Band									
Modes	GSM850 (GPRS class 8)			GSM850 (EDGE class 8)			WCDMA Band V (RMC12.2kbps)		
Channel	128 (Low)	189 (Mid)	251 (High)	128 (Low)	189 (Mid)	251 (High)	4132 (Low)	4182 (Mid)	4233 (High)
Frequency (MHz)	824.2	836.4	848.8	824.2	836.4	848.8	826.4	836.4	846.6
Conducted Power (dBm)	32.67	32.63	32.79	26.90	26.66	26.74	23.34	23.24	23.49
Conducted Power (Watts)	1.85	1.83	1.90	0.49	0.46	0.47	0.22	0.21	0.22

PCS Band									
Modes	GSM1900 (GPRS class 8)			GSM1900 (EDGE class 8)			WCDMA Band II (RMC12.2kbps)		
Channel	512 (Low)	661 (Mid)	810 (High)	512 (Low)	661 (Mid)	810 (High)	9262 (Low)	9400 (Mid)	9538 (High)
Frequency (MHz)	1850.2	1880	1909.8	1850.2	1880	1909.8	1852.4	1880	1907.6
Conducted Power (dBm)	29.56	29.66	29.46	25.68	25.90	26.03	24.03	23.92	23.87
Conducted Power (Watts)	0.90	0.92	0.88	0.37	0.39	0.40	0.25	0.25	0.24

AWS Band			
Modes	WCDMA Band IV (RMC12.2kbps)		
Channel	1312(Low)	1413 (Mid)	1513 (High)
Frequency (MHz)	1712.4	1732.6	1752.6
Conducted Power (dBm)	23.34	23.58	23.41
Conducted Power (Watts)	0.22	0.23	0.22

Note: maximum burst average power for GSM, and maximum average power for WCDMA.

3.2 Field Strength of Spurious Radiation Measurement

3.2.1 Description of Field Strength of Spurious Radiated Measurement

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least $43 + 10 \log (P)$ dB. The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

3.2.2 Measuring Instruments

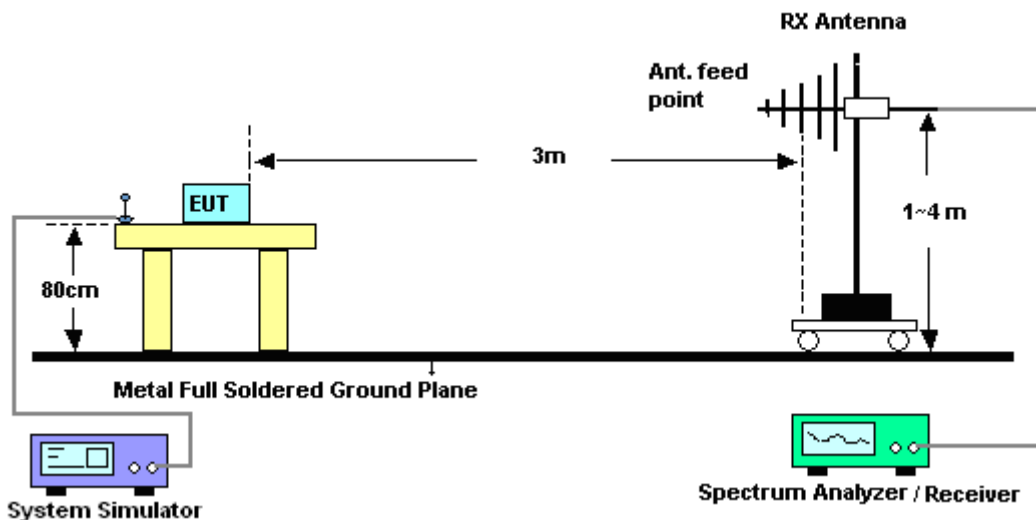
The measuring equipment is listed in the section 4 of this test report.

3.2.3 Test Procedures

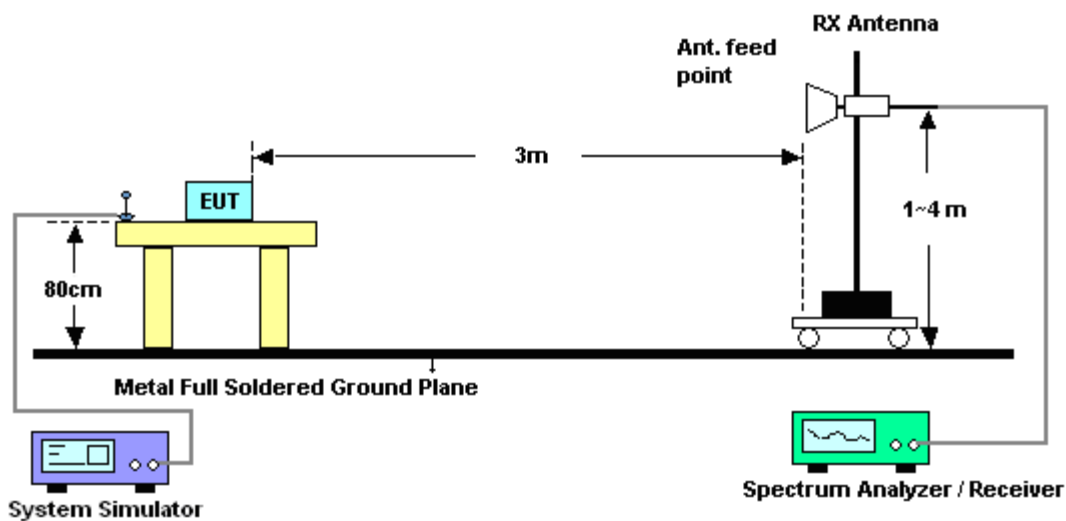
1. The EUT was placed on a rotatable wooden table with 0.8 meter above ground.
2. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest spurious emission.
4. The height of the receiving antenna is varied between one meter and four meters to search the maximum spurious emission for both horizontal and vertical polarizations.
5. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
6. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
7. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
8. Taking the record of output power at antenna port.
9. Repeat step 7 to step 8 for another polarization.
10. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
11. The limit line is derived from $43 + 10\log(P)$ dB below the transmitter power P(Watts)
 $= P(W) - [43 + 10\log(P)] \text{ (dB)}$
 $= [30 + 10\log(P)] \text{ (dBm)} - [43 + 10\log(P)] \text{ (dB)}$
 $= -13\text{dBm}.$
12. $\text{EIRP (dBm)} = \text{S.G. Power} - \text{Tx Cable Loss} + \text{Tx Antenna Gain}$
13. $\text{ERP (dBm)} = \text{EIRP} - 2.15$

3.2.4 Test Setup

For radiated emissions from 30MHz to 1GHz

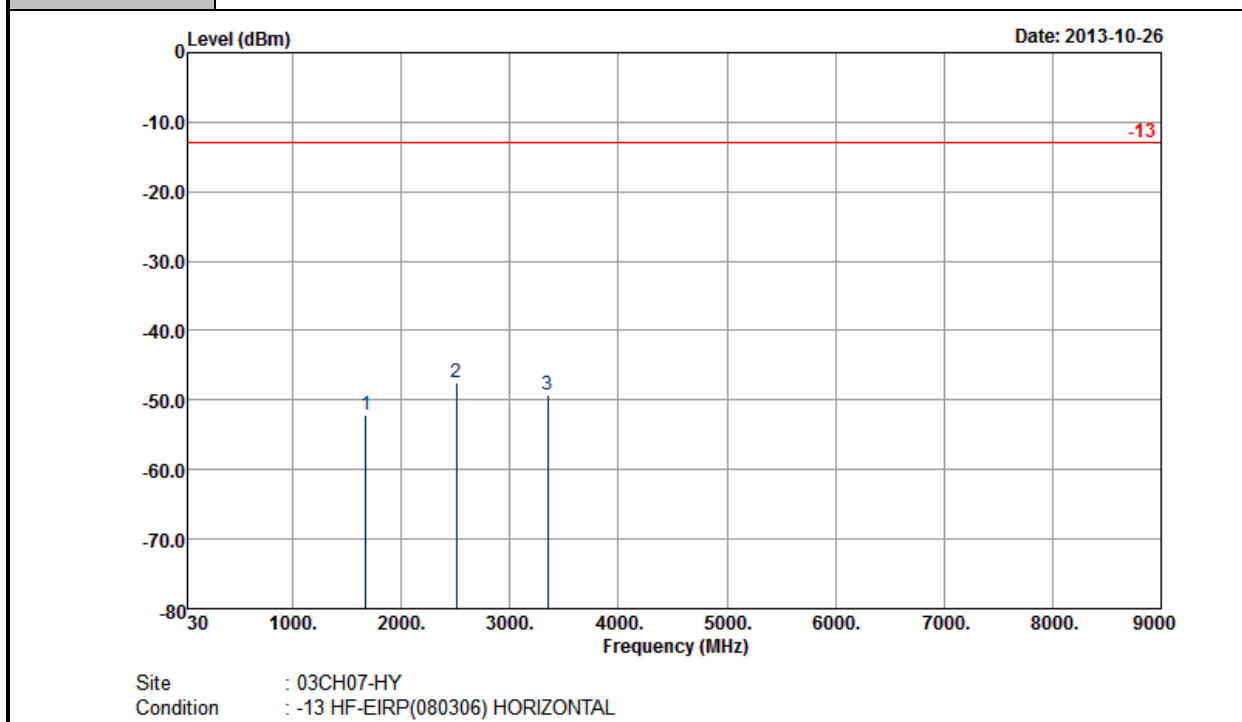


For radiated emissions above 1GHz



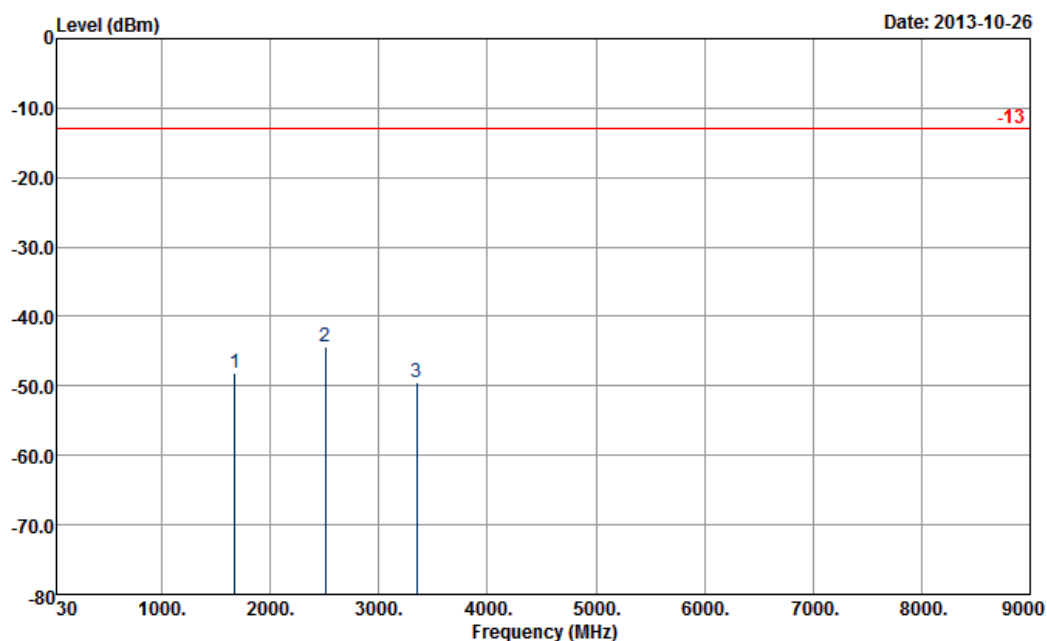
3.2.5 Test Result of Field Strength of Spurious Radiated

Band :	GSM850	Temperature :	22~25°C
Test Mode :	GPRS class 8 Link (GMSK)	Relative Humidity :	51~54%
Test Engineer :	Eric Shih	Polarization :	Horizontal
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		



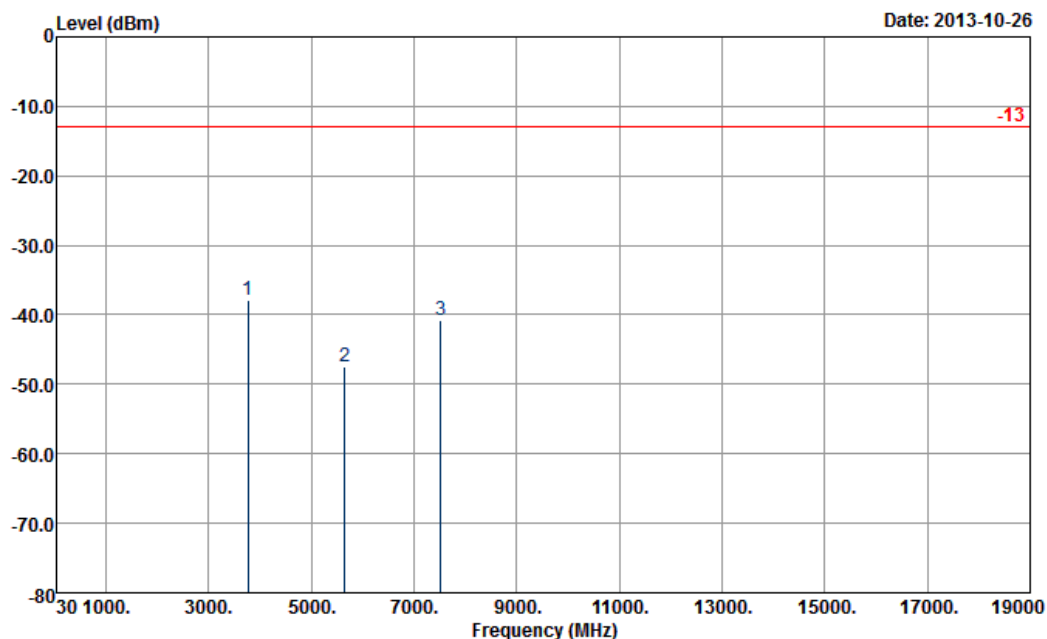
Frequency (MHz)	ERP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
1672	-52.24	-13	-39.24	-61.27	-56.11	1.62	5.49	H	Pass
2509	-47.52	-13	-34.52	-60.72	-51.64	2.1	6.22	H	Pass
3346	-49.32	-13	-36.32	-63.92	-54.36	3.03	8.07	H	Pass

Band :	GSM850	Temperature :	22~25°C
Test Mode :	GPRS class 8 Link (GMSK)	Relative Humidity :	51~54%
Test Engineer :	Eric Shih	Polarization :	Vertical
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		



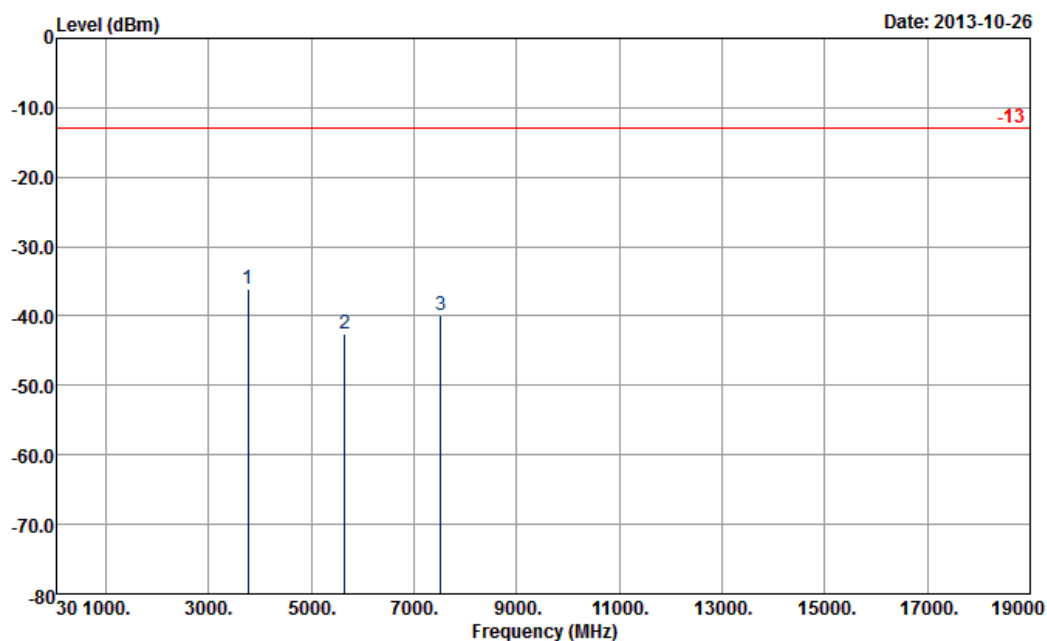
Frequency (MHz)	ERP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
1672	-48.16	-13	-35.16	-59.36	-52.03	1.62	5.49	V	Pass
2509	-44.37	-13	-31.37	-58.17	-48.49	2.1	6.22	V	Pass
3346	-49.53	-13	-36.53	-65.42	-54.57	3.03	8.07	V	Pass

Band :	GSM1900	Temperature :	22~25°C
Test Mode :	GPRS class 8 Link (GMSK)	Relative Humidity :	51~54%
Test Engineer :	Eric Shih	Polarization :	Horizontal
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		



Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
3760	-37.80	-13	-24.80	-53.26	-44.1	2.51	8.81	H	Pass
5640	-47.39	-13	-34.39	-68.24	-55.1	2.99	10.70	H	Pass
7520	-40.87	-13	-27.87	-68.21	-49.4	3.59	12.12	H	Pass

Band :	GSM1900	Temperature :	22~25°C
Test Mode :	GPRS class 8 Link (GMSK)	Relative Humidity :	51~54%
Test Engineer :	Eric Shih	Polarization :	Vertical
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		



Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
3760	-36.10	-13	-23.10	-52.47	-42.4	2.51	8.81	V	Pass
5640	-42.59	-13	-29.59	-63.34	-50.3	2.99	10.70	V	Pass
7520	-39.97	-13	-26.97	-67.21	-48.5	3.59	12.12	V	Pass



4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
System Simulator	Rohde & Schwarz	CMU200	117997	N/A	Aug. 29, 2013	Oct. 31, 2013	Aug. 28, 2014	Conducted (TH02-HY)
Spectrum Analyzer	Rohde & Schwarz	FSP30	101067	9kHz~30GHz	Nov. 30, 2012	Oct. 26, 2013	Nov. 29, 2013	Radiation (03CH07-HY)
Bilog Antenna	Schaffner	CBL6111C	2726	30MHz ~ 1GHz	Oct. 10, 2013	Oct. 26, 2013	Oct. 09, 2014	Radiation (03CH07-HY)
Double Ridge Horn Antenna	ESCO	3117	75962	1GHz~18GHz	Aug. 22, 2013	Oct. 26, 2013	Aug. 21, 2014	Radiation (03CH07-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170251	15GHz- 40GHz	Oct. 03, 2013	Oct. 26, 2013	Oct. 02, 2014	Radiation (03CH07-HY)
Preamplifier	COM-POWER	PA-103A	161241	30MHz~1GHz	Feb. 26, 2013	Oct. 26, 2013	Feb. 25, 2014	Radiation (03CH07-HY)
Preamplifier	Agilent	8449B	3008A02362	1GHz~26.5GHz	Dec. 01, 2012	Oct. 26, 2013	Nov. 30, 2013	Radiation (03CH07-HY)
Turn Table	ChainTek	ChainTek 3000	N/A	0 ~ 360 degree	N/A	Oct. 26, 2013	N/A	Radiation (03CH07-HY)
Antenna Mast	ChainTek	ChainTek 3000	N/A	N/A	N/A	Oct. 26, 2013	N/A	Radiation (03CH07-HY)

5 Uncertainty of Evaluation

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	2.54
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Uncertainty of Radiated Emission Measurement (1 GHz ~ 40 GHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	4.72
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Appendix B. Original Report

Please refer to Sporton report number FG352141A as below.